

Permutations and Combinations — CBSE Pattern Test 1

Class 11 Maths · 90 minutes · 40 marks · Sections A–D with answer key · Narayan Gurukul Academy

Test 1 — CBSE Pattern (90 minutes, 40 marks)

Class 11 Maths · Permutations and Combinations · Narayan Gurukul Academy (ClassApna)

General Instructions: (1) This paper has four sections — Section A (1×10), Section B (2×4), Section C (3×4) and Section D (5×2) — total 40 marks. Time allowed: 90 minutes.
(2) All questions are compulsory. No overall choice is given; internal choice, where allowed, is clearly marked.
(3) For MCQ questions choose the single correct option; for VSA answers write a single line.
(4) Take $g = 10 \text{ m/s}^2$. All symbols carry their usual meaning. Use of a calculator is not permitted.

Section A — MCQ & VSA ($10 \times 1 = 10$ marks)

- If an event can occur in m ways and another in n ways, then the number of ways both can occur is
 - $m \times n$
 - $m + n$
 - $m - n$
 - m^n
- The value of $5!$ is
 - 120
 - 20
 - 24
 - 60
- The value of $0!$ is
 - 1
 - 0
 - undefined
 - infinite
- The number of arrangements of the letters of 'BOOK' is
 - 12
 - 24
 - 6
 - 4
- The number of circular permutations of n distinct objects is
 - $(n - 1)!$
 - $n!$
 - $n!/2$
 - $(n + 1)!$
- The value of ${}^5C_2$ is
 - 10
 - 20
 - 5
 - 15
- ${}^nC_r$ is equal to
 - ${}^nC_{(n-r)}$

- (B) nPr
 (C) $n!$
 (D) $r! n!$
8. $nC0$ is equal to
 (A) 1
 (B) 0
 (C) n
 (D) $n!$
9. Evaluate $5!$.
10. Write the formula for nCr .

Section B — Short Answer I ($4 \times 2 = 8$ marks)

11. State the fundamental principle of counting (multiplication).
 12. Write the formula for nPr .
 13. Write the formula for circular permutations of n distinct objects.
 14. Find the value of $nC0$ and nCn .

Section C — Short Answer II ($4 \times 3 = 12$ marks)

15. Evaluate $8P3$.
 16. Find the number of distinct permutations of the letters of 'ALLAHABAD'.
 17. In how many ways can 6 people sit around a round table?
 18. In how many ways can a committee of 4 be chosen from 10 people?

Section D — Long Answers ($2 \times 5 = 10$ marks)

19. In how many ways can a committee of 5 be chosen from 6 men and 4 women so as to include exactly 2 women?
 20. Prove that $nCr + nC(r-1) = (n+1)Cr$. Find n if $2nC3 : nC2 = 12 : 1$.

Answer Key (Marking Scheme)

- Q1 — (A) $m \times n$. Q2 — (A) 120. Q3 — (A) 1. Q4 — (A) 12.
 Q5 — (A) $(n-1)!$. Q6 — (A) 10. Q7 — (A) $nC(n-r)$. Q8 — (A) 1.
 Q9 — 120.
 Q10 — $nCr = \frac{n!}{(r!(n-r)!)}$.
 Q11 — If an event occurs in m ways and another in n ways, both occur in $m \times n$ ways.
 Q12 — $nPr = \frac{n!}{(n-r)!}$.
 Q13 — $(n-1)!$.
 Q14 — Both equal 1.
 Q15 — 336.
 Q16 — $9!/(4! 2!) = 7560$.
 Q17 — 120.
 Q18 — 210.
 Q19 — $4C2 \times 6C3 = 120$.

Q20 — Standard proof; $n = 6$.